A paper was also in part read, entitled "Experimental Researches in Electricity." Twenty-third Series. § 29. On the Polar or other condition of Diamagnetic Bodies. By Michael Faraday, Esq., F.R.S. &c.

March 14, 1850.

GEORGE RENNIE, Esq., Vice-President and Treasurer, in the Chair.

The reading of Dr. Faraday's paper, entitled "Experimental Researches in Electricity. Twenty-third Series. § 29. On the Polar or other condition of Diamagnetic Bodies:" was resumed and concluded.

The author, whilst developing, on a former occasion, the phenomena of diamagnetic action, said that all the results might be accounted for by assuming that bismuth, phosphorus, &c., when in the magnetic field, became polar as iron is polar, but with the poles in the contrary direction. This view has since then been adopted by Weber and others, and supported by certain experimental results. In the present paper these results and that view are brought under very close examination. An apparatus was constructed by which a cylinder of any given metal could be moved to and fro through about two inches in the direction of its axis. In doing this it approached close up to, and then retreated from the pole of an electro-magnet, and also moved within a helix of covered wire which was fixed in relation to the magnet. Now the action of such a piece of metal upon the helix is very different in theory, and also in reality, according as it is dependent upon a polarity, magnetic or diamagnetic, acquired by the metal, or upon induced currents existing in the mass; and the question was to ascertain by experiment whether the latter were the cause of the results obtained by Weber and others. The various diamagnetic metals gave the results looked for at the indicating galvanometer; but then these were almost insensible with bismuth, and were greatest with gold, silver, copper, and the better conductors, being indeed in proportion to the conducting power. Such results were in favour of induced currents rather than of polarity. *Division* was next resorted to as a distinguishing test of the polar or current action; thus a cylinder made up of lengths of wires acted as well as a solid cylinder, if the metal were one acquiring a polar state as iron; but such a division interfered with the existence of induced currents in the mass, and it was found that such wire cylinders of copper, &c. lost all power. On the other hand, division of the cylinder into innumerable discs interfered greatly with polarity, but not at all with the induced currents, nor with the action of the diamagnetic metals. The places of maximum and minimum action of a cylinder of metal are very different according as that metal acts by a polar condition, or by currents induced in the mass: it is shown by experiments with the diamagnetic metals that

their places of maximum and minimum action accord with the effects of induced currents. *Time* has great effect over results produced by currents induced in the mass, and none over those due to polarity. By this test the effects of the diamagnetic metals are found due to induced currents.

The phenomena produced by the use of the present apparatus are then shown to be in close and direct relation to the phenomena of revulsion formerly described by the author: the parallel is closely carried out and extended, and both sets of effects referred to one and the same cause.

The author endeavours to repeat an experiment described by Reich, but without success; and he finds that even when iron is used no arrangement of magnets can produce any test of polarity at all comparable to the use of an astatic needle or to suspension between the poles of a powerful magnet, and thinks that arrangements which are thus less sensible with iron are not likely to be more sensible with diamagnetic metals, even if they are polar.

Finally, the author does not consider that the idea of diamagnetic polarity has gained as yet any additional proof beyond the fact that diamagnetic bodies, such as bismuth and phosphorus, are repelled by one or both magnetic poles; he does not reject the idea of polarity, but his opinion or judgment remains the same as at the time of its announcement in 1845.

A paper was also read, entitled "Contributions to the Chemistry of the Urine.—Paper IV. On so-called Chylous Urine." By H. Bence Jones, M.D., A.M., F.R.S. &c.

The definition given of chylous urine is, that it is urine which is white from the suspension of fatty matter in it. An opportunity of observing a case of this disease having occurred to the author, he was led to make the experiments described in this paper. A harness-maker, age 32, half-caste, who had lived in London for twelve years, had been passing such water for nine months. On examination of the water made at 2 P.M. it solidified, looking like blanc-mange in ten minutes. It was very feebly acid, contained fibrin, albumen, blood-globules and fat; specific gravity=1015. 1000 grs. of this urine gave—

44·42	grs. total solid residue.
8·01	grs. total ash.
14·03	grs. albumen.
8·37	grs. fat.
13·26	grs. urea and extractive matter.
·75	gr. loss.
955·58	grs. water.

In order to watch the variations produced by food and exercise in the appearance of the urine, every time the urine was made, for five days and nights it was passed into bottles marked with the hour. From these observations, and more particularly from the third, fourth, and sixth days, it was evident that the fibrin and albumen appear in the urine when no fat is there, and that the albuminous urine occurs